

## ***HOW TO MAKE A SMOKE BOMB***



You should use protective gloves when making colored smokes, and cover all surfaces with newspaper or some other covering to be thrown away later. Working with smoke mix can be very messy no matter how careful you are. The dyes will stain anything they come in contact with, so lay down newspaper over your work surfaces and protect your hands with rubber gloves.

### **Mix the chemicals**

An easy method for mixing small amounts of insensitive composition is called "bag milling."



Use a plastic bag big enough so it is not more than half full after adding all the chemicals. If you are going to mix the whole kit at one time, dump all of the smoke mix and the potassium chlorate oxidizer into the bag. Use your fingers to break up any lumps while mixing the composition. Once mixed, the material should be a consistent color and have no sign of any lumps. If you're not sure if it's mixed enough, keep mixing. The more you mix, the better the generated smoke will be. If you want to mix less than the contents of the whole kit, the proportions should be 27% potassium chlorate and 73% smoke mix **by weight**. You must use an accurate gram scale to weigh them. Once mixed, your smoke is basically ready to go. It will actually burn just fine in the open without any containment. This is a good way to test how well it's mixed. The composition should light easily with a match or fuse, and burn with little or no visible flame. But to use your smoke for anything practical, you'll need to build a container for it. In the instructions that follow, that canister will be a paper tube with cardboard end plugs.

### Build a smoke canister

Place a small bead of white (Elmer's or carpenter's) glue around the inside lip of the paper tube



and press the plug into place. Using your fingertips, seat the plug flush with the end of the tube. You can insert the plug either way into the tube. Once this is done, set the tube aside to dry for several hours.

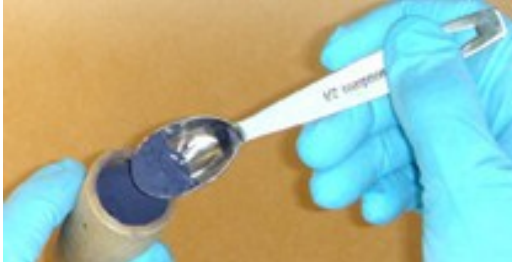
### Make a fuse cap

Holding a paper plug between your fingers, poke a hole large enough to slide a length of visco fuse through. The fuse should be cut long enough so that you can push the fuse through the

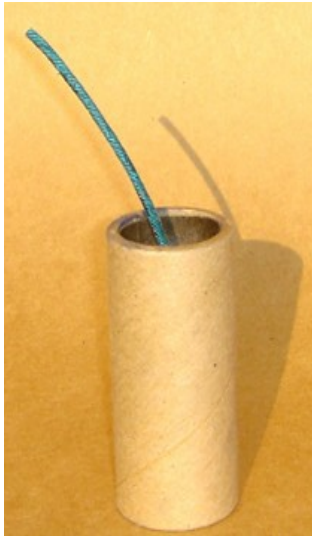


cap and all the way to the bottom plug. Set the fuse cap assembly aside for now.

### **Load smoke composition and cap the tube**



Using a small scoop, loosely fill the tube with smoke composition up to about one-quarter inch from the top. There is no need to compact the smoke composition. Keeping it loose and fluffy will increase the burn rate and also improve the color of the smoke produced. In the same way that you glued the end



plug in, place a small bead of glue around the inner lip of the canister and slide the fused plug in place. Once done set the canister aside to dry for a couple of hours until the glue is dry. Once it's dry, just light the fuse and let her smoke! Enjoy.

### **Suggestions & troubleshooting:**

**Q: After lighting, the bottom or top plug pops out.**

**A:** Be sure your plugs are thoroughly glued in and that the glue is dry. If they still pop out, increase the size of the smoke vent. Bigger smoke devices need larger orifices for smoke to vent. Try punching several holes in the top plug.

**Q: How can I make the smoke comp burn faster?**

**A:** In some instances you may want to generate a lot of smoke very quickly. The best method is to add 5% dextrin and dampen the mixture slightly until it just holds its shape when you squeeze it in your hand. If water comes out when you squeeze it, it's too wet. Then press the dampened composition through a 10-20 mesh screen to granulate it. Once dry, load the granules loosely in a smoke canister.

**Q: The smoke is vivid in color for awhile, but then fades to gray.**

**A:** The ash is trapping the sublimed dye. You can either make a smaller or shorter device or mix 15% fine sawdust (-40+60 mesh) into the smoke mix. Either should resolve the problem.

## Recipes for colored smoke bombs

The recipes for colored smoke bombs require chemicals that may not be readily available unless you have access to a chemistry lab, but it's worth knowing how it's done. Parts or percents are by weight. The ingredients are sifted together and ignited to produce the smoke. Powdered *organic dye* (such as synthetic indigo or an aniline-based dye, found in some craft & hobby shops; not common water-based dye) Blue and Orange make the best organic dyes for smoke bombs.

### *Making Colored Smoke Bombs*

- Recipes for colored smoke bombs seem to be under debate on the Internet. Different guides often offer conflicting information, making it difficult to tell just how possible it is to successfully make your own colored smoke bombs.
- Some sites say that potassium nitrate smoke bombs **cannot be colored**. United Nuclear: [Smoke Bombs 4](#) Even [About.com](#) states that "recipes for colored smoke bombs require chemicals that may not be readily available unless you have access to a chemistry lab."
- However, [About.com](#) also posted a formula in which 3 tablespoons powdered *organic dye* is added to a potassium nitrate mixture. (Incidentally, both articles are written by the same person.) Although you can find [videos online that demonstrate how this can be done](#), other videos have suggested that they are faked. Metacafe: [How to Make an Amazing Colored Smoke Bomb](#) (Time: 2:28)<sup>16</sup>  
Metacafe: [Re: Ultimate COLORED Smoke Bomb - Fake Video](#) (Time: 1:39)<sup>17</sup>

### **White Smoke Recipe**

- Potassium nitrate - 6 parts
- Sugar – 4 parts

### **White Smoke Recipe [2]**

- Potassium nitrate - 4 parts
- Charcoal - 5 parts
- Sulfur - 10 parts
- Wood dust - 3 parts

### **PURPLE SMOKE FORMULA**

Disperse Red Dye 80  
Potassium Chlorate 56  
Sodium Bicarbonate 46  
Sulfur 10

### **Red Smoke Recipe**

- Potassium chlorate - 15%
- para-nitroaniline red - 65%
- Lactose – 20%

### **Green Smoke Recipe**

- Synthetic indigo - 26%
- Auramine (yellow) - 15%
- Potassium chlorate - 35%
- Lactose – 26%

### **Blue/Orange Smoke Recipe**

- Potassium nitrate - 6 parts
- Sugar – 4 parts
- 1 table spoon Baking Soda
- 2 table spoons Organic Blue/Orange. DyeOrganic Powdered Dye (found in hobby shops)

### **• A good non toxic smoke formula from Dr Simon Horwell**

Potassium Nitrate .....60%  
Charcoal Powder .....20%  
Ammonium Chloride .....20%

### **More Smoke Formula**

- Smoke Bomb 1: Carbon tetrachloride 40% Zinc dust 40% Potassium chlorate 20%
- Smoke Bomb 2: Carbon tetrachloride 45% Zinc Oxide 45% Aluminum 10%
- Smoke Bomb 3: Potassium Nitrate 60% Phosphorus 40%

- Smoke Bomb 4: Ammonium chloride 100%
- Smoke Bomb 5: Zinc powder 80% Sulphur powder 20%
- Smoke Bomb 6: Sugar 40% Sulphur 40% Potassium Nitrate 20%
- Smoke Bomb 7: Sawdust 50% Oil 10% Potassium Nitrate 40%
- Smoke Bomb 8: Road Flare chemical? 10% Sugar 45% Sulphur 45%
- Smoke Bomb 9: Sugar 40% Potassium Nitrate 60%
- Smoke Bomb 10: Zinc dust 38.5% Hexachloroethene 46.5% Ammonium chloride 3% Potassium perchlorate 12%
- Smoke Bomb 11: Zinc powder 34% Ammonium nitrate powder 66% (Put in film canister w/ hole. To light put a few drops of water down the hole and throw.)
- Smoke Bomb 12: Titanium chloride 100%
- Smoke Bomb 13: Potassium nitrate 33% Sugar 33% Wax shavings 34%
- Smoke Bomb 14: Soak Ammonium Nitrate in water until it dissolves. Pour onto newspapers until it dries like cardboard. Roll up newspaper and tie tightly with wire. For best results, wrap with foil leaving a "chimney" for smoke to come out. on the other end, make a hole so you can open it, light, and close it back up. (This smoke bomb is really hard to light, so take a butane lighter)
- Smoke Bomb 15: Get lots of ping pong balls and dissolve them in acetone. Mix 4 parts Ammonium nitrate and PVC Glue and 1 part melted ping pong balls. Make the potassium nitrate/sugar smoke bomb (melted). While the potassium nitrate/sugar smoke bomb is melting, add the ammonium nitrate/PVC glue/ping pong ball mixture and stir them all together. Take a small bit and light. If there is a flame, add sawdust to your mixture. If not, you're done.
- Smoke Bomb 15: Potassium nitrate 26% Sugar 17% Ammonium chloride 26% Potassium chlorate 28% Sodium bicarbonate 3%
- Smoke Bomb 16: Potassium chlorate 34% Naphthalene 33% Absorbic acid 33%
- Smoke Bomb 17: Potassium chlorate 50% Sugar 17% Charcoal dust 16% Naphthalene 17%
- Note: All smoke bombs must be mixed and lit, except for #11. If the smoke bomb does not light, try tweaking with the percentages. Also, you can change the percentages to find the maximum smoke production. Some of these smoke bombs can give off deadly fumes and not all are recommended for paintball.

## **How do I make a smoke bomb with-out starting a Fire?**

Colored smoke devices use a formula that consists of an oxidizer (typically potassium chlorate,  $\text{KClO}_3$ ), a fuel (generally sugar), a moderant (such as sodium bicarbonate) to keep the reaction from getting too hot, and a powdered organic dye. The burning of this mixture evaporates the dye and forces it out of the device, where it condenses in the atmosphere to form a "smoke" of finely dispersed particles.

A simple smoke powder can be made by gently mixing saltpeter (potassium nitrate,  $\text{KNO}_3$ ) and sugar in roughly a ratio of 60% saltpeter to 40% sugar; add more sugar for a



slower burn and more  $\text{KNO}_3$  for a faster burn. The more finely ground the saltpeter and sucrose, the better the smoke bomb. The mixture can be used as a loose powder or consolidated by adding enough water to make a thick paste, making a small lump of about a tablespoon in size, and letting it dry overnight. This is much safer than heating such a mixture, which has resulted in too many cases of accidental ignition. "Smoke Bomb gone awry", New York Times.

This formula has a variant in which the ingredients are left in powder form and the granulated sugar is replaced with powdered sugar. More success could potentially be enjoyed when one adds another flammable substance to the mixture without "cooking" it. **The best choice for this is melted paraffin.**

### **Smoke bombs are useful to military units, airsoft games, paintball games, and self defense.**

A smoke bomb is a firework designed to produce smoke upon ignition. Smoke bombs are useful to military units, airsoft **games**, paintball games, and self defense.

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First you'll have to gather the ingredients:

- Potassium Nitrate (salt peter found in garden **shops**)
- Sugar (found everywhere)
- **Baking Soda**
- Organic Powdered Dye (found in hobby shops)

Time to start cooking.....

- Mix Potassium and Sugar – 60g Potassium to 40g Sugar
- Put on a LOW heat and stir
- Sugar will start to caramelize
- Keep stirring until it looks like peanut butter
- Add 1 spoon of **baking** soda – this will slow combustion
- Add 3 large spoons of dye (orange or blue works best)
- Mix very thoroughly
- Fill a card tube with mix

- Push a thick pen into mix
- Leave to set for 1 hour
- The shape it has formed using the pen as a mold will give best results
- Remove pen
- Insert firework fuse – secure with cotton wool
- Wrap tube with duct tape, making sure there is a hole at the top.

## ***Smoke Bomb Tips***

1. Safety measures should be taken before making or lighting any smoke bombs.
2. The easiest smoke bomb to make uses potassium nitrate and [sugar](#).
3. Potassium nitrate is sold as a fertilizer and stump remover.
4. You can also make smoke bombs using ping pong balls and tin foil.
5. Colored smoke bombs are harder to make.

## ***Introduction***

• A smoke bomb is a type of [firework](#) that produces smoke after it is ignited. There are several ways they can be made at home. ***Smoke bombs should only be made and used by adults or under adult supervision, while taking proper safety precautions.*** In a study done in 2002 by the U.S. Consumer Product Safety Commission revealed that people have [burned their eyes and received second degree burns](#) from smoke bombs. U.S. Consumer Product Safety Commission: [2002 Fireworks Annual Report 1](#)

• The [National Council of Fireworks](#) offers these [safety tips](#) when using any fireworks:

1. Use only outdoors.
2. Check with local laws before making or using.
3. Always have water handy.
4. Never re-light a dud. Wait 20 minutes, and then soak it in water.
5. Keep spectators at a safe distance.
6. Wear safety glasses when lighting. National Council of Fireworks:

[Consumers Warned of Illegal Explosives and Urged to Follow Consumer Fireworks Safety Tips 2](#)



• **Note:** The smoke bombs listed here are not good methods of getting rid of moles, voles, gophers, [rabbits](#) and other burrow dwelling creatures because they do not contain sulfur ([which asphyxiates the animals](#)). Utah State University Extension: [Can I use Smoke Bombs to Kill Gophers in my Yard](#) <sup>3</sup> For information on how to deal with these animals, check out Mahalo's [How to Get Rid of Moles](#).

### **1. Method 1: Sugar and Potassium Nitrate (Cooked)**

• You can mix potassium nitrate (KNO<sub>3</sub> or saltpeter) and [sugar](#). Do not try to make too big of a bomb at first. It will be [difficult to mix and heat evenly](#). United Nuclear: [Smoke Bombs](#) <sup>4</sup>

1. Mix together about [three parts potassium nitrate and two parts sugar](#). United Nuclear: [Smoke Bombs](#) <sup>4</sup> You can also opt to use [five parts potassium nitrate to two parts sugar](#) in the skillet. The exact ratio is not important as long as you have more potassium nitrate. However, the more potassium nitrate, [the harder it will be to light](#). About.com: [How to Make a Smoke Bomb](#) <sup>5</sup>

2. You can add [about 1 teaspoon of baking soda for every 5 tablespoons of potassium nitrate/sugar mix](#) to [help moderate the reaction rate and keep it from getting too hot](#). About.com: [Ultimate Colored Smoke Bomb](#) <sup>6</sup>

3. Pour the mixture into a skillet or saucepan.

4. Place the pan over **low** heat. If you heat it too quickly, [the mixture will turn black and can ignite](#). United Nuclear: [Smoke Bombs](#) <sup>4</sup> If possible, do this step on a hot plate outside.

5. Stir the mixture with a spoon using long, smooth strokes.

1. If the grains of sugar start to melt along the edges where you are stirring, [remove the pan from the heat and reduce the temperature before continuing](#). About.com: [How to Make a Smoke Bomb](#) <sup>5</sup>

2. The mixture will [turn brown \(similar to caramel candy or peanut butter\) as it melts](#). United Nuclear: [Smoke Bombs](#) <sup>4</sup>

6. Remove pan from the heat.

7. The mixture can then be used to make smoke bombs in a variety of ways, including:

1. Spooning out [lumps onto concrete](#). United Nuclear: [Smoke Bombs](#) <sup>4</sup>
2. Pouring into [cardboard molds](#). United Nuclear: [Smoke Bombs](#) <sup>4</sup>
3. Pouring onto [a piece of foil and molding](#) to a desired shape. About.com: [How to Make a Smoke Bomb](#) <sup>5</sup> (Remove foil before using.)

8. If you want to add a wick or fuse, [do so before the mixture dries](#). United Nuclear: [Smoke Bombs 4](#) You can also [light the mixture directly](#). About.com: [How to Make a Smoke Bomb 5](#)

### ***Method 2: Sugar and Potassium Nitrate (Uncooked)***

- If you are concerned with heating the potassium nitrate, there are two ways you can make a smoke bomb that do not require cooking.

#### ***1. Using Water***

1. Mix 3 parts potassium nitrate to 2 parts sugar (granulated not powdered).
2. [Add just enough water to form a paste](#) and stir together. About.com: [Safe Non-Cook Smoke Bomb 7](#)
3. [Allow the bombs to dry thoroughly](#) (about 2 days) before using. About.com: [Safe Non-Cook Smoke Bomb 7](#)

#### ***2. Without Water***

1. [Sift together](#) powdered sugar and potassium nitrate. About.com: [How to Make a Smoke Bomb 5](#)
2. Then, either [ignite the powder directly](#) or place it in a cup and use a napkin for a fuse. About.com: [How to Make a Smoke Bomb 5](#)  
Ratio of potassium nitrate to powdered sugar can be [the same as the cooked version \(3:2 or 5:3 parts potassium nitrate to sugar\)](#). About.com: [How to Make a Smoke Bomb 5](#)
3. Some examples show using [equal parts of potassium nitrate and powdered sugar](#). Metacafe: [How To Make A Smoke Bomb!](#) (Time: 1:32)<sup>8</sup>  
As mentioned previously this mixture can be used in a dry state by individually grinding the chemicals into a fine powder and mixing together until it is [homogeneous](#). You can also use icing sugar which is already a fine powder. However you will get a far more superior result if these chemicals are melted together. Also, adding a small spoonful of baking soda to the mixture before the heating phase will slow the burn rate effectively creating more smoke. **This method can be dangerous if not followed correctly!** The melting of sugar and potassium nitrate can lead to the ignition of the mixture. Do not melt this mixture without taking proper precautions such as having a water source near to control an accidental ignition, never cooking over an open flame, and **never** cooking inside or near flammable material.

### ***How to Find Potassium Nitrate***

- One of the biggest issues in making smoke bombs is where to find potassium

nitrate. Potassium nitrate is used as a fertilizer and may be [sold as saltpeter in garden supply stores](#) as Stump Remover. [check ingredients label on package] About.com: [Ultimate Colored Smoke Bomb](#) 6 It is also the primary ingredient in at least two varieties of stump remover: [Spectracide's Stump Remover MSDS](#) and [Grant's Stump Remover Spectracide: Stump Remover MSDS](#) 9 McLendon's Hardware: [Stump Remover](#) 10 (Potassium nitrate helps accelerate natural decomposition.) However, you should not assume that all stump removers are potassium nitrate. Check the ingredients list before using. Also, the potassium nitrate needs to be in powder form and may need to be purified before using.

- Potassium nitrate (or rather saltpeter) has also been used in hoodoo [for magical protection and in spells](#). Hoodoo in Theory and Practice: [Saltpeter](#) 11 So, it may be sold in stores that sell magical supplies. If worse comes to worst, you can also [make your own potassium nitrate](#). Skeptic Tank: [How to make Potassium Nitrate](#) 12
- You can find potassium nitrate online at any of the following locations:

Google Product Search: "[Potassium Nitrate](#)"

1. The Science Company: [Potassium Nitrate](#)
2. AmericaRx.com: [Humco SaltPetre Powder \(Potassium Nitrate Powder\)](#)

### ***Method 3: Using Ping Pong Balls***

- You can make a smoke bomb with only the use of a few ping pong balls, a drinking straw, a piece of aluminum foil and a pair of scissors.

1. Poke or drill a hole into one side of a ping pong ball.
2. Cut the other three or four balls into small pieces with a scissors.
3. [Carefully insert the pieces](#) into the first ping pong ball (the one with the hole).Revver: [Make a Smoke Bomb Out of Ping Pong Balls](#) (Time: 1:14) 13
4. Insert a [3-inch piece of a drinking straw into the hole](#). Instructables: [Make a Smoke Bomb out of Ping Pong Balls](#) 14
5. Wrap the ball with a small piece of aluminum foil. Do not cover the hole.
6. Your smoke bomb is ready to light. Hold the lighter to the bottom of the smoke bomb [until you see it start to smoke](#). Metacafe: [How To Make A Smoke Bomb Out Of A Ping Pong Ball](#) (Time: 2:33) 15

#### **Method 4 ("Safer")**

Mix:

- 30 parts Potassium nitrate
- 20 parts Sugar
- 5 parts liquid fuel (honey or karo syrup) (not essential but makes much better smoke mix)

This method creates optimal thrust and leaves little to no dross at all. Since the sugar can be caramelized, the quality will increase greatly, and the rate of which it caramelizes can be controlled by picking up the pan, or stirring more often.

This may be done indoors as well as out.

In a saucepan.

Add just enough water to dissolve some of the powder. Place saucepan on high and stir constantly until all water is boiled off, and you are left with a light to mid-yellow paste. Shape in a mold, or allow to cool. The drier, the better! Easy as that. No hard formulas or extensive instructions. Can be completed start to finish in well under an hour!

#### **Method 5("Safer")**

***It must be noted that melting potassium nitrate and sugar together can very often lead to accidental ignition .***

Take the powdered mixture of potassium nitrate and sugar (in the same proportions given) and place it in a paper or soft plastic cup, wet it with enough water to make a thick paste, (as thick as oatmeal). Stir this with a chopstick or plastic spoon until evenly mixed. Then place the wet mixture on wax paper in little mounds of about a tablespoon each, insert a fuse in it, and allow to dry for one or two days. (The drying time will depend on your climate). This will produce a semi-hard lump somewhat similar to the melting process.

If a rock hard lump is desired you can use shellac which comes as a solution in alcohol in the hardware stores for furniture finishing. Note: this is usually methyl alcohol, which is toxic, so best to let it dry outside, or with plenty of ventilation. This is one of the things professional fireworks makers use for binding powders together. A tablespoon of nitrate sugar powder mixed at room temperature with about a half teaspoon of the liquid shellac will give a thick paste, adjust the mix until you get something as thick as oatmeal. If shellac is used it is necessary to raise the amount of Potassium Nitrate by 5 % to 10% (depending on how much shellac you use). This is necessary to burn the shellac which produces about as much smoke as sugar. Insert the fuse while the mixture is still wet. The shellac mixture dries best if it is not more than a tablespoon at a time, and pressed fairly flat (about 1/4 inch thick), because if large quantities are used it forms an outside crust which prevents the inside from drying. Drying time is two to three days.

If you want a faster drying mixture first dilute the shellac one to three with rubbing alcohol (isopropanol) Use 100% alcohol if you can get it, 90% minimum. Use the diluted shellac in the same proportions (one half teaspoon to 1 tablespoon powder) to make a paste, and this will dry better.

Don't ignite more than a tablespoon or two of the dried mixture at a time, and only use paper cups as containers, and of course don't set it off were it could start a fire. Either of these methods produce about as much smoke as the melting method but with far less risk of it igniting by itself.

## **Longer lasting smoke bomb**

If you are looking for a much more dense, longer lasting smoke bomb, then consider using a Sulfamic Acid/Ammonium Perchlorate based smoke bomb. By far the most smoke output of any smoke device I have ever seen, or probably ever will. The 200 gram smoke bomb you linked to would be beaten by a 60 gram sulfamic acid type smoke device easily. Hence why the military uses it.